CLAIMS

1. A computer-implemented method for determining cluster centres (13_1 - 13_6) in a first data structure (10), wherein the first data structure comprises a lattice structure (12) of weight vectors that create an approximate representation of a plurality of input data points (11);

the method comprising:

performing a first iterative process (81) for iteratively updating the weight vectors such that they move toward cluster centres (13_1 - 13_6);

performing a second iterative process (82) for iteratively updating a second data structure (70 - 72) utilizing results of the iterative updating of the first data structure; and

determining, on the basis of the second data structure (70 - 72), the weight vectors that correspond to cluster centres of the input data points.

2. A method according to claim 1, wherein each iteration in the first iterative process (81) comprises:

selecting a winner weight vector (v) for each data point on the basis of the distance between the data point and the weight vectors; and

calculating a next value for each weight vector on the basis of the current value of the weight vector and a first neighbourhood function (21, h) of the distance on the lattice structure between the weight vector and the winner weight vector; and

the second data structure (70 - 72) comprises a first coefficient (Ci) for each of the weight vectors in the lattice structure and each iteration in the second iterative process (82) comprises calculating (806) a next value of each first coefficient (Ci) on the basis of:

the current value of the first coefficient; and a combination of:

a first coefficient of the winner weight vector (v),

a second neighbourhood function (51, h_m) of the distance on the lattice structure between the weight vector and the winner weight vector, and

an adjustment factor (δ) for adjusting convergence speed between iterations.

3. A method according to claim 1 or 2, wherein the step of determining the weight vectors that correspond to cluster centres comprises selecting local maxima in the second data structure (70 - 72).

4. A method according to claim 2 or 3, wherein the combination is or comprises multiplication.

5. A method according to any one of claims 2 to 4, wherein the second neighbourhood function (51, h_m) is not monotonous.

6. A method according to any one of claims 2 to 5, wherein the first coefficients are limited to the range [0,1] and the second neighbourhood function (51, h_m) gives negative or positive values, respectively, for some distances.

7. A method according to any one of claims 2 to 6, wherein the second neighbourhood function (51, h_m) depends on the number of prior iterations.

8. A method according to any one of the preceding claims, wherein the input data points (11) represent real-world quantities.

9. A method according to any one of claims 2 to 8, wherein the first data structure (10) is or comprises a self-organizing map.

10. A method according to claim 9, further comprising:

estimating an upper limit K for the number of clusters in the self-organizing map;

defining a coefficient vector $\Theta i = (\theta_{i,1}, \theta_{i,2}, \ldots \theta_{i,K})$ for each weight vector i in the self-organizing map, the coefficient vector comprising K second coefficients $\theta_{i,l}$, each of which represents a weighting between the weight vector i and a label l; and

assigning cluster label l to weight vector i if:

$$l = \underset{1 \le k \le K}{arg\,max}\ \theta_{i,k}.$$

11. A method according to claim 10, wherein each iteration in the second iterative process (82) comprises calculating (806') a next value of each second coefficient on the basis of the current value of the second coefficient and a combination of:

a coefficient of the winner weight vector,

a third neighbourhood function (131, h_B) of distance, and

an adjustment factor (δ) for adjusting convergence speed between iterations.

12. A computer-readable program product comprising a computer program code, wherein executing the computer program code in a computer causes the computer to carry out the steps of the method according to claim 1.